

Vicinity to large towns has a visible influence over vegetation. Around London it possesses a good deal of luxuriance. A cause for this may be sought in the state of the atmosphere liable to exist among such a crowd of habitations and human beings. Pure air, after being once respired by man, contains about 3·6 per cent. carbonic acid; but the extreme dilution this must undergo in mixing with the bulk of the atmosphere, renders it unlikely that it will have any visible effect. It is more probable that the immense quantity of carbon, in an extremely fine, light, and divided state, which escapes in smoke after combustion, is a more influential cause. It is now in a condition to be suspended, if not dissolved, in water, and can pass readily through the structures of plants; and the good effects of certain proportions of carbon in a convertible state has been proved by experiment. In estimating the influence of large towns on vegetation, it must not be lost sight of, that combustion also gives rise to some of a deleterious tendency. Sulphurous acid is produced in a sufficient quantity to impair the functions of plants in a sensible manner, and even the bad effects of an extremely minute proportion have been noticed. Those plants which are observed to prefer the vicinity of clustered habitations have then, most probably, some connexion with the resulting state of the atmosphere whence they derive benefit; some may receive positive benefit or stimulus from it, and others be equally injured.

LVI.—*A Catalogue of Shells from the Crag.*
By S. V. WOOD, Esq., F.G.S.

[Concluded from p. 462.]

Class GASTEROPODA.

Ord. PHYTOPHAGA.

<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Man. Crag.</i>	<i>Recent.</i>
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| 1. <i>Capulus ungaricus, de Montf.</i> (<i>Patella ungarica, Mont. Test. Brit.</i>
p. 486. <i>Patella unguis, var. β. Min. Con. t. 139. f. 7.</i>
<i>Ramsholt.</i> <i>Sutton.</i> <i>Britain.</i> |
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This exceeds in magnitude the recent British specimens. My largest fossil has attained the (transverse) diameter of two inches and a quarter. A very variable species: some of my specimens are conical, with the apex nearly central, while others are so much depressed, that the apex is on a level with the base projecting beyond it.

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| 2. — <i>obliquus, n. s.</i> | <i>WaltonNaze.</i> |
| 3. — <i>recurvatus, n. s.</i> | <i>WaltonNaze.</i> |

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
4. <i>Capulus fallax</i> , n. s.	|	Sutton.	|	|
1. <i>Emarginula crassa</i> , Sow. (<i>Min. Con.</i> t. 33).	Ramsholt.	| Sutton.	|	|
2. — <i>fissura</i> , <i>Flem.</i> (<i>Brit. An.</i> p. 365. <i>Patella fissura</i> , <i>Linn. Syst.</i> p. 1261. <i>Emarginula reticulata</i> , <i>Min. Con.</i> t. 33).	Sutton.	| Sutton.	| . . . . .	| Britain.
3. — <i>punctura</i> , n. s.	Sutton.	|	|	|
1. <i>Fissurella cancellata</i> (<i>Patella cancellata</i> , <i>Lister</i> , t. 527. f. 2. <i>Fissurella græca</i> , <i>Min. Con.</i> t. 483).	Sutton.	| WaltonNaze.	| . . . . .	| Britain.
var. β . <i>depressa</i> .	Ramsholt.	|	|	|

This is larger than the generality of recent British specimens, reaching one inch and a half in its longitudinal diameter. The perforation is of an oblong form, rounded at each extremity and slightly contracted in the middle. In very young specimens the vertex is visible, recurved, and directed towards the *posterior*, which might cause it to be mistaken for another genus. When the shell has attained the length of one quarter of an inch this recurvature is lost.

1. *Dentalium costatum*, Sow. (*Min. Con.* t. 70. f. 8).
 Sutton. | Sutton. |

Perfect specimens have a dorsal cleft at the posterior extremity to the depth of a line; the aperture is then partially covered with a convex sort of epiphragm which has a cleft across it, as is well represented in *D. fissura* of Sowerby's 'Genera'; this I have only seen when the posterior extremity has attained the diameter of nearly a line: very small specimens (corresponding in all other respects, and as such I have considered them as the young of this species) have a circular opening at the posterior extremity without the cleft. The number of costæ in this species varies from ten to eighteen, with occasionally a small one between them. My largest specimen measures one inch and seven-eighths, but fragments indicate a greater magnitude.

Dent. striatum, Mont. Test. Brit. p. 495, appears, from the description, to correspond with my small specimens.

1. *Velutina lævigata* (*Helix lævigata*, *Linn. Syst.* p. 1250. *Bulla velutina*, *Müller, Zool. Dan.*).
 Sutton. | | Bramerton. | Britain.

2. — *elongata*, Forbes (*Report Brit. Assoc.* 1839, p. 80).
 This has been identified by Mr. Forbes.

(*Sigaretus similis*? *Woodward, Geol. of Norf.* t. 3. f. 8).
 | | Thorpe. | Britain.

3. — *capuloïdes*, n. s.
 Sutton. | | |

1. *Marsenia depressa*.
 Sutton. | | |

Spec. Char. Shell depressed, subtrapezoidal; outer lip much expanded; inner replicate, lower part slightly projecting; lines of growth visible. Diameter one-eighth of an inch. Pl. V. f. 8, 9.

Only two specimens (perhaps young ones), but they appear to differ from the young of the recent species (*Marsenia producta*, Leach, Moll. p. 47; *Bulla haliotoidea*, Mont. T. B. p. 211. t. 7. f. 6.) in their more expanded outer, and the projection at the lower part of the inner lip, and more depressed form.

Cor. Crag. Red Crag. Mam. Crag. Recent.

1. *Natica catenoides* (*Natica glaucinoides*, *Min. Con.* t. 479. f. 4; not *N. glaucinoides*, *Deshayes*).

Sutton. | Sutton. | Bramerton. |

It is necessary to change the name of this species, as the two shells figured in 'Min. Con.' as *glaucinoides* are, I believe, distinct. I have not yet seen a London clay shell that can be identified with our crag species, of which a faithful representation is given at the above reference.

2. — *catena* (*Nerita glaucina*, *Mont. Test. Brit.* p. 469. *Cochlea catena*, *Da Costa*, p. 83. t. 5. f. 7).

| Sutton. | | Britain.

3. — ? *multipunctata* (*Natica patula*, *Min. Con.* t. 373).

Ramsholt. | WaltonNaze. |

This differs from *Nat. millepunctata* in the greater size of the umbilical callosity, at all ages sufficient, I think, to constitute a specific difference. There are the remains of spots in two of my specimens from the red crag of Walton Naze similar to those upon the *millepunctata*, and as the name of *patula* is preoccupied, I propose the one above as expressive of its ornament and of its affinity.

A thick calcareous operculum is in the cor. crag at Ramsholt, which may possibly belong to this; if so, it is not the *millepunctata*, as it differs from the operculum of that species. Risso has justly separated from *Natica* those species with a calcareous operculum, for which he has proposed the name of *Nacca*; this may probably be referred to it.

4. — *hemiclausula*, *Sow.* (*Min. Con.* t. 479).

| WaltonNaze. |

The umbilicus of this is closed in the adult shell.

5. — *cirriformis*, *Sow.* (*Min. Con.* t. 479).

Ramsholt. | |

6. — *helicoides*, *Johnston* (*Hist. of the Berwickshire Nat. Hist. Club*, 1834).

| Sutton. | Bramerton. | Scottish coast.

7. — *clausa*, *Gray* (*Zool. of Beechey's Voy.* t. 37. f. 6. and t. 34. f. 3. *Nat. clausa*, *Smith, Verm. Mem.* vol. viii. pl. 1. f. 16).

| Sutton. | | North Seas.

8. — *elevata*, n. s.

Ramsholt. | |

	Cor. Crag.	Red Crag.	Mam. Crag.	Recent.
9. <i>Natica proxima</i> , n. s.				
Ramsholt.	|	|	|	|
10. — <i>depressula</i> , n. s.?				
Sutton.	|	|	|	|

Not more than one-eighth of an inch. Three specimens of this small shell, which I cannot affiliate to any of my crag species, although I have many young specimens quite as minute; however, till more be found, it must be considered doubtful.

Natica depressa, Min. Con. t. 5, is probably a French shell, or from the Isle of Wight, figured by mistake as from the crag.

An abundance of individual specimens are found, especially in the red crag; but the labour of identification is great, from the difficulty of procuring specimens that are not more or less altered by decomposition, or rather decortication, many having the outer covering entirely removed, showing in some instances a striated surface upon a shell which in its natural state is perfectly smooth; and in most of the species of this genus a deep depression is visible at the suture when the exterior coating is removed, which materially alters the appearance of the shell.

1. *Adeorbis* (n. g.) *striatus*, *mihi*.

Sutton.			
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Gen. Char. Whorls subdiscoidal, volutions few, peritreme sharp, inner lip sinuous, umbilicus large and deep.

Spec. Char. Shell depressed; volutions four, rounded, slightly impressed by the preceding whorl, spirally striated; outer lip sharp, projecting; inner sinuous; umbilicus large, open, volutions visible to the apex. Diameter one-seventh of an inch. Pl. V. f. 4 and 6.

There is an incipient sinus in the upper part of the aperture, which gives in one of the species particularly (*supra-nitida*) a depression at the upper part of the volution at a little distance from the suture.

I consider this distinct from *Skenia* in the form of the peritreme, which, in that genus, is circular and not sinuous.

2. *Adeorbis supra-nitidus*, n. s.

Sutton.			
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3. — *tricarinatus*, n. s.

Sutton.			
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4. — *subcarinatus* (*Helix subcarinata*, *Mont. Test. Brit.* p. 438. pl. 7. f. 9. *Trochus subcarinatus*, *Brown, Conch. Illust.* pl. 51. f. 16, 17).

Sutton.			Britain.
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5. —? *subimbricatus*, n. s.

Sutton.			
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1. *Margarita helicina*, n. s.

Sutton.			
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2. — *trochoidea*, n. s.

Sutton.			
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1. *Scissurella crispata*? *Flem. (Brit. An.* p. 366).

Sutton.			Britain.
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My only specimen is unfortunately imperfect. It is strongly ribbed and spirally striated, and what there is of it remaining appears to agree with Dr. Fleming's full description.

<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
1. <i>Solariella</i> (n. g.) <i>maculata</i> , <i>mihi</i> .			
Sutton.	|	|	|

Gen. Char. Subtrochiform, depressed; spire acute; peritreme sub-circular; umbilicus large, deep and crenulated; shell nacreous.

Spec. Char. Subtrochiform; volutions five, subcircular; carinated; carinae three, rugose; base striated; umbilicus crenulated; shell nacreous. Diameter three-eighths of an inch. Axis one-fourth of an inch nearly. Pl. V. f. 7 and 10.

The elevated carinae give an angulated appearance to the otherwise nearly cylindrical form of the volutions, which are slightly impressed by the preceding whorl; carinae of different sizes and at unequal distances, the upper one most prominent, producing a depressed ambulacrum or furrow at the suture; upper part of the peritreme projecting a little beyond the lower: fragments and small specimens are abundant.

I have ventured to propose a new genus for this shell, conceiving the subcylindrical form of the volutions to have no generic connexion with the quadrangular opening of the *Solarium*. It is probably intermediate between *Trochus* and *Margarita*.

The specific name is added from the remains of coloured spots in one specimen.

Sect. β . imperforate.

1. <i>Trochus ziziphinus</i> , <i>Auct.</i>	|	Sutton.	|	.....	|	Britain.
2. — <i>pseudo-ziziphinus</i> (<i>Schlott. Pet.</i> p. 160. <i>Trochus Sedgwickii</i> , <i>Min. Con.</i> t. 272. f. 1).	|	Ramsholt.	|	|	|	|
3. — <i>granosus</i> , <i>Lamarck</i> (<i>Hist. des An. sans Vert.</i> vii. p. 20).	|	WaltonNaze.	|	.....	|	Mediterranean.
4. — <i>conulus</i> ? <i>Lamarck</i> (<i>Hist. des An. sans Vert.</i> vii. p. 24).	|	Sutton.	|	.....	|	Mediterranean.
5. — <i>quadricinctus</i> , n. s.?	|	Sutton.	|	|	|	|
6. — <i>Montacuti</i>.	|	Sutton.	|	.....	|	Britain.
Identified by Mr. Edward Forbes.						
7. — <i>subexcavatus</i> , n. s.	|	Sutton.	|	|	|	|
8. — <i>asperulus</i> , n. s.	|	Sutton.	|	|	|	|

The shells of this genus from the crag are much altered by decoration, consequently difficult of identification.

Sect. α . umbilicated.

9. — <i>cinereoides</i> , n. s.		Walton Naze				
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	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
10. Trochus tumidus, <i>Mont. (Test. Brit. p. 280. t. 10. f. 4. Trochus nitens? Woodward, Geol. of Norf. t. 3. f. 10).</i>	Sutton.	Sutton.	Britain.
11. — littoralis, <i>Brown (Illust. Brit. Conch. pl. 45. f. 1, 4).</i>		| Sutton.	| .....	| Britain.
12. — obconicus, n. s.	Sutton.	|		|
13. — bicariniferus, n. s.	Sutton.	|		|
14. — tricarinerus, n. s.	Sutton.	|		|
1. Vermetus intortus, <i>Bronn (Lethæa Geognostica, taf. 36. f. 18).</i>	Sutton.	| Sutton.	|	
1. Valvata piscinalis, <i>Gray (Edit. of Turt. Man. pl. 10. f. 114).</i>		|	| Bulcham.	| Britain.
Captain Alexander's cabinet.				
1. Paludina unicolor, <i>Swainson (Zool. Illust. pl. 98. Paludina media, Woodward, Geol. of Norf. t. 3. f. 5, 6. Paludina rotundata, id. t. 3. f. 7. Paludina lenta, Min. Con. t. 31. f. 3).</i>		|	| Bramerton.	| Bengal.
1. Bithynia tentaculata, <i>Gray (Edit. of Turt. Man. pl. 10. f. 120. Paludina impura, Lamarck, vi. p. 175).</i>		|	| Bulcham.	| Britain.
Captain Alexander's cabinet.				
1. Littorina littoreus (Turbo littoreus, <i>Min. Con. t. 71. f. 1. Turbo rudis, id. t. 71. f. 2. Turbo carinatus, Woodward, Geol. of Norf. t. 3. f. 11. Turbo ventricosus, id. t. 3. f. 12. Turbo bicarinatus, id. t. 3. f. 13. Turbo sulcatus, id. t. 3. f. 14, 15. Delphinula carinatus, id. t. 3. f. 9. Littorina squalida, Zool. of Beechey's Voy. pl. 34. f. 12).</i>		| Sutton.	| Bramerton.	| Britain.
I have considered the above as referrible to one species, as they can be connected by every shade of difference. The cause of these deformities may perhaps have been a more than ordinary alteration of the water, both in respect to its density and temperature, in the estuary which these shells in all probability inhabited. Specimens occasionally found in the red crag preserve a uniformity of shape similar to those with which our markets are supplied.				
2. — elongata (Turbo elongatus, <i>Woodward, Geol. of Norf. t. 3. f. 16-18).</i>		|	| Bramerton.	|
I have never seen this shell.				
3. — ? suboperta (Vivipara suboperta, <i>Min. Con. t. 31. f. 1).</i>		| Sutton.	|	|
4. — ? phasianelloides, n. s.		| Sutton.	|	|

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
12. <i>Rissoa striata</i> (<i>Turbo striatus</i> , <i>Mont. Test. Brit.</i> p. 312, <i>Cingula striata</i> , <i>Flem. Brit. An.</i> p. 307).	Sutton.	|	|	Britain.
13. — ? <i>vitrea</i> (<i>Turbo vitreus</i> , <i>Mont. Test. Brit.</i> p. 321. t. 12. f. 3).	Sutton.	|	|	Britain.
1. <i>Alvania albella</i> , <i>Leach MS.</i>	Sutton.	|	|	Britain.
2. — <i>supranitida</i> , n. s.	Sutton.	|	|	
<i>Spec. Char.</i> Shell turriculate; whorls eight; convex, spirally ridged; suture deep; upper part of volution naked; apex acute; outer lip curved; umbilicus small. Axis one-seventh of an inch. Pl. V. f. 2.				
Differs from <i>Turbo ascaris</i> , Turt., in the unequal distribution of the striæ or ridges, which are five in number, the lower one not so prominent as the others; it is also more slender, and the upper part of the volution smooth, with a thickening behind the outer lip.				
1. <i>Turritella incrassata</i> , <i>Sow.</i> (<i>Min. Con.</i> t. 51. f. 6).	Ramsholt.	|	Sutton.	|
This much resembles a recent shell, probably identical.				
2. — <i>terebra</i> , <i>Lamarck</i> (<i>Turbo terebra</i> , <i>Linn. Syst.</i> p. 1239).	|	Sutton.	|	Bramerton. | Britain.
3. — <i>conoidea</i> , <i>Sow.</i> (<i>Min. Con.</i> t. 51. f. 1, 5, 6).	|	Sutton.	|	|
My specimens are all much rubbed and water-worn.				
4. — <i>bicineta</i> , <i>mihl</i> (<i>Turritella duplicata</i> , <i>Dubois, Geol. Wolhyn. Podol.</i> pl. 2. f. 19, 20).	Gedgrave.	|	Sutton.	|
This strongly resembles a recent shell, but is quite distinct from <i>T. duplicata</i> , Lamarck, Ency. pl. 449. f. 1. a, b.				
5. — <i>planispira</i> , n. s.	Sutton.	|	|	|
1. <i>Eulima polita</i> , <i>Risso</i> (<i>Turbo politus</i> , <i>Linn. Syst.</i> p. 1241. <i>Helix polita</i> , <i>Mont. Test. Brit.</i> p. 398).	Ramsholt.	|	WaltonNaze. |	..... | Britain.
2. — <i>subulata</i> , <i>Risso</i> (iv. p. 122. <i>Helix subulata</i> , <i>Mont. Test. Brit. Sup.</i> p. 142. <i>Melania Cambessedesii</i> , <i>Bronn, Leth. Geog.</i> taf. 42. f. 46. <i>Turbo subulatus</i> , <i>Don. Brit. Shells</i> , t. 172).	Sutton.	|	..... |	..... | Britain.
3. — <i>glabella</i> , n. s.	Sutton.	|	|	|
4. — ? <i>pendalia</i> , n. s.	|	Sutton.	|	|
1. <i>Scalaria similis</i> , <i>Sow.</i> (<i>Min. Con.</i> t. 16).	|	Sutton.	|	Thorpe. |

This much resembles *Sc. Gröenlandica*, *Turbo Clathrus Gröenlandicus*, Chemn. Conch. xi. t. 19. f. 1878-79; but a comparison with

three recent specimens presents the following differences:—the volutions of the fossil are more convex, the suture deeper, and the whole shell less conical with a more prominent keel upon the base of the body whorl.

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
2. <i>Scalardia clathratulus</i> , <i>Flem. (Brit. An. p. 311. Turbo clathratulus, Walker, Test. Min. rar. t. 2. f. 45. Scalardia minuta, Min. Con. t. 390. Scalardia pseudo-scalaris, Dubois, Geol. Wolhyn. Podol. pl. 2. f. 36, 37).</i>	Sutton.	Sutton.	Britain.

3. — <i>fimbriata.</i>	Sutton.	Mediterranean.
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4. — *foliacea*, *Sow. (Min. Con. t. 390. f. 2).*

Sutton.	Sutton.	
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This is given by Philippi, *Enum. Moll. Sic. p. 167*, as a synonym to *Sc. pseudo-scalaris*. The crag shell differs in not having a keel upon the body whorl.

5. — *subulata*, *Sow. (Min. Con. t. 390. f. 1).*

Sutton.		
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6. — *frondosa*, *Sow. (Min. Con. t. 577. f. 1).*

Sutton.		
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7. — *frondicula*, n. s.

Sutton.		
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8. — *fimbriosa*, n. s.

Ramsholt.		
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9. — ? *obtusicastrata*, n. s.

Sutton.		
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10. — ? *decussata*, *Desh. (Hist. Coq. foss. des Env. de Par.).*

Sutton.		
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The French shell appears to have the volutions more convex and the suture deeper; but my crag specimens are all imperfect.

1. *Phasianema sulcata.*

Sutton.		
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Gen. Char. Spire slightly elevated; volutions few; aperture ovate; exterior striated, umbilicated.

Spec. Char. Ovato-fusiform; volutions three, convex; suture deep; apex obtuse, spirally sulcated, decussated by lines of growth; aperture ovate; outer lip sharp, inner slightly replicate; umbilicus small, with an incipient fold upon the columella. Axis one-seventh of an inch. Pl. V. f. 15.

2. — *lineolata*, n. s.

Sutton.		
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Sect. a. columella plain.

1. *Turbonilla elegantissima*, *Leach MS. (Turbo elegantissimus, Mont. Test. Brit. p. 298. t. 10. f. 2).*

Sutton.			Britain.
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	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
2. <i>Turbonilla rufa</i> ? (<i>Melania rufa</i> , <i>Phil. Enum. Moll. Sic.</i> t. 9. f. 7). Sutton. Mediterranean. Specimens imperfect.				
3. — <i>acicula</i> ? (<i>Melania acicula</i> , <i>Phil. Enum. Moll. Sic.</i> t. 9. f. 6). Sutton. | | | Specimens imperfect.				
4. — <i>curvicostata</i> , n. s. Sutton. | | |				
5. — <i>cylindrella</i> , n. s. Sutton. | | | A recent species in Mr. G. B. Sowerby's possession is identical with this; locality unknown.				
6. — <i>subulata</i> , n. s.? Sutton. | | | This may possibly be a very slender variety of <i>elegantissima</i> : only one specimen.				
7. — <i>filosa</i> , n. s. Sutton. | | |				
8. — <i>costaria</i> , n. s. Sutton. | | |				
9. —? —? Sutton. | | | Specimens imperfect.				
10. —? —? Sutton. | | | Specimens imperfect. Sect. β . with a fold upon the columella.				
11. — <i>elegantior</i> , n. s. Sutton. | | |				
12. — <i>elegans</i> , n. s. Sutton. | Sutton. | |				
All the shells I have included in this genus (proposed by Dr. Leach in MS. and adopted by Risso) have a mammillated apex, caused by the reversed position of the extreme spire.				
1. <i>Odostomia plicata</i> , <i>Flem.</i> (<i>Brit. An.</i> p. 310. <i>Turbo plicatus</i> , <i>Mont. Test. Brit.</i> p. 325). Sutton. | ..... | ..... | Britain.				
Var. β <i>convexa</i> . Sutton. | | | Axis five-sixteenths of an inch; outer lip toothed within. <i>Auricula hordeola</i> (<i>Desh. Coq. foss. des Env. de Par.</i> pl. 6. f. 21, 22).				
The crag shell is rather larger than the recent, which is the only difference I can detect.				

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
2. <i>Auricula pupa</i> (<i>Melania pupa</i> , <i>Dubois, Geol. Wolhyn. Podolien.</i> t. 3. f. 34, 35).	Sutton. |	|	|	|
3. — <i>reticulata</i> , n. s.	Sutton. |	|	|	|
1. <i>Acteon Noæ</i> , <i>Sow. (Min. Con. t. 374).</i>	|	WaltonNaze. |	|	|
2. — <i>subulatus</i> , n. s.	Sutton. |	Sutton. |	|	|
3. — <i>levidensis</i> , n. s.	Sutton. |	|	|	|
4. — <i>tornatilis</i> (<i>Acteon striatus</i> , <i>Min. Con. t. 460. f. 2.</i> <i>Voluta tornatilis</i> , <i>Mont. Test. Brit. p. 231).</i>	Sutton. |	Sutton. |	..... |	Britain.
1. <i>Pyramidella læviuscula</i> , n. s.	Sutton. |	|	|	|

This differs from the figure of *P. plicosa* (Bronn, *Leth. Geogn. taf. 40. f. 24*) in having only three plicæ, one large and two small.

1. <i>Trichotropis borealis</i> , <i>Lowe (Zool. Journ. Fusus umbilicatus, Smith, Mem. of Wernerian Nat. Hist. Soc. vol. viii. p. 50. fol. 1. f. 2).</i>	Ramsholt.	Rothsay Bay.
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1. *Macromphalus reticulatus.*

Sutton.		
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Gen. Char. Shell fusiform; spire elevated; aperture ovate; outer lip sharp; umbilicus linear.

Spec. Char. Shell fusiform; volutions convex; suture deep; surface reticulate; aperture ovate; peritreme sharp, continuous; umbilicus linear, striate. Axis one-fourth of an inch. Pl. V. f. 16.

The lengthened form of the umbilicus has suggested the name proposed for the genus.

Sect. *a.* dextral.

1. *Cerithium punctatum*, *Woodw. (Geol. of Norf. t. 3. f. 29).*

	Sutton.	Bramerton.
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2. — *trilineatum*, *Phil. (Enum. Moll. Sic. p. 195. t. 13. f. 13).*

Sutton.	Mediterranean.
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I presume this to be identical; the lower part corresponds, but the apex of the crag shell is obtuse, and the two first volutions possess longitudinal costæ. This portion is not shown in the figure above referred to.

3. — *tuberculare* (*Murex tubercularis*, *Mont. Test. Brit. p. 270).*

Sutton.	Britain.
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4. — *creperum*, n. s. ?

Sutton.		
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Numerous specimens, but all much mutilated.

5. — *cribrarium*, n. s. ?

Sutton.		
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About a dozen fragments.

	Cor. Crag.	Red Crag.	Mam. Crag.	Recent.
6. <i>Cerithium punctulum</i> , n. s.		WaltonNaze.		
7. — <i>funiculatum</i> ? <i>Sow. (Min. Con. t. 147).</i>		| Sutton. |		|
One mutilated specimen only.				
Sect. β . sinistral.				
8. — <i>adversum</i> (<i>Murex adversus</i> , <i>Mont. Test. Brit. p. 271).</i>		| .....	| .....	| Britain.
9. — <i>granosum</i> , n. s.		| WaltonNaze. |		|

Ord. ZOOPHAGA.

	Cor. Crag.	Red Crag.	Mam. Crag.	Recent.
1. <i>Cancellaria costellifer</i> (<i>Murex costellifer</i> , <i>Min. Con. t. 119. f. 3.</i> <i>Cancellaria buccinoides</i> , <i>Couthouy, Boston Journ. of Nat. Hist.</i> <i>vol. ii. pl. 3. f. 3. p. 105).</i>	| Sutton. |	| Sutton. |	| .....	| Coast of United States.
2. — <i>concinna</i> , n. s.	| Sutton. |			|
Specimens imperfect.				
3. — <i>subangulosa</i> , n. s.	| Sutton. |			|
Specimens imperfect.				
4. — <i>mitræformis</i> (<i>Voluta mitræformis</i> , <i>Brocchi. p. 645. t. 15. f. 13).</i>	| Gedgrave, near Orford. |	| Sutton. |		|
5. — <i>lævicosta</i> , n. s.	| Sutton. |			|
6. — <i>granulata</i> (fragment).	| Ramsholt. |			|
7. — —?		| Sutton. |		|
Two much-worn specimens.				
1. <i>Cassidaria bicatenata</i> (<i>Cassis bicatenata</i> , <i>Sow. Min. Con. t. 151).</i>	| Ramsholt. |	| Felixtow. |		|
1. <i>Purpura incrassata</i> , <i>Sow. (Min. Con. t. 414).</i>		| Sutton. |		|
2. <i>Purpura lapillus</i> , <i>Lamk. (Buccinum lapillus, Linn. Syst. p. 1202.</i> <i>Buccinum crispatum, Min. Con. t. 413. Murex angulatus,</i> <i>Woodward, Geol. of Norf. t. 3. f. 23, 24. Murex lapilliformis,</i> <i>id. t. 3. f. 25. Murex compressus, id. t. 3. f. 26).</i>		| Sutton. |	| Bramerton. |	| Britain.

These deformed varieties from the mam. crag are probably produced by the same cause to which I have assigned the many different shapes of *Littorina littoreus*.

Cor. Crag. *Red Crag.* *Mam. Crag.* *Recent.*

1. *Columbella sulcata* (*Buccinum sulcatum* (var. α .), *Sow. Min. Con.* t. 375, f. 2. *Buccinum sulcatum* (var. β .), *id.* t. 477. f. 4).
 Sutton. | WaltonNaze. |

Litiopa papillosa, n. s.

Sutton. |

Spec. Char. Shell smooth; whorls four, slightly convex; apex obtuse; aperture subovate; outer lip sharp, inner slightly replicate, forming a minute umbilicus. Axis one-sixth of an inch. Pl. V. f. 11. Distinct from the recent species found in the Gulf weed in being free from striæ, and in having an obtuse apex.

1. *Ringicula buccinea*, *Desh.* (2nd edit. *Lamk. Hist. des An. sans Vert.* viii. p. 344. *Auricula buccinea*, *Min. Con.* t. 465. *Pedipes buccinea*, *Bronn, Leth. Geog.* p. 1014. taf. 42. f. 8).
 Sutton. | Sutton. |

2. — *ventricosa* (*Auricula ventricosa*, *Min. Con.* t. 465).
 Sutton. | Sutton. |

1. *Nassa incrassata*, *Flem. (Brit. An.* p. 340. *Tritonium incrassatum*, *Zool. Dan. Prod.* p. 244. no. 2946. *Buccinum macula*, *Test. Brit.* p. 241. t. 8. f. 4).
 Sutton. | | Britain.

2. — *rugosa*, *Sow. (Min. Con.* t. 110. f. 3).
 Sutton. |

3. — *reticosa*, *Sow.* (var. α . *Min. Con.* t. 110. f. 2. *Nassa elongata*, var. β . *Min. Con.* t. 110. f. 1).
 Sutton. | WaltonNaze. |

Var. γ . *tiara*, mihi.

| Sutton. |

Var. δ . *angulata*, mihi.

| WaltonNaze. |

Var. ϵ . *deformis*, mihi.

| WaltonNaze. |

4. — *reticulata?* *Auct.*

| WaltonNaze. | | Britain.

This differs in the general form of the volutions being more ventricose, the whole contour more elegant, and in the absence of that gibbosity and slight deformity by which the recent shell is disfigured; it is a doubtful identification.

5. — *fenestrella*, n. s.

| Sutton. |

6. — *microstoma*, n. s.

| Sutton. |

7. — *propinqua*, *Sow. (Min. Con.* t. 477).
 Sutton. |

8. — *elegans*, *Sow. (Min. Con.* t. 477. f. 1).
 WaltonNaze. |

Not *Buc. elegans* of Dujardin.

9. — *granulata*, *Sow. (Min. Con.* t. 110. f. 1).
 Sutton. | Sutton. | Bramerton. |

	Cor. Crag.	Red Crag.	Mam. Crag.	Recent.
10. <i>Nassa labiosa</i> (<i>Buccinum labiosum</i> , <i>Min. Con.</i> t. 477).	Sutton. |	Sutton. |		
11. — <i>proxima</i> , n. s.	|	Sutton. |		
12. — <i>costula</i> , n. s.	Sutton. |	Sutton. |		
13. — <i>conglobata</i> (<i>Buc. conglobatum</i> , <i>Broc. Conch. Foss. Subapennina</i> , p. 334. t. 4. f. 15. <i>Buc. pupa</i> , <i>id.</i> t. 4. f. 14).				

This unique specimen was recently found in the red crag of Walton-on-the-Naze by Mr. Charlesworth, and liberally deposited in my cabinet.

1. *Buccinum Dalei*, *Sow.* (*Min. Con.* t. 486. f. 1, 2).

Ramsholt. | WaltonNaze. |

The difference between this and *Buc. ovum*, *Turt. Zool. Journ.* xi. p. 366. t. 13. f. 9, is in the striæ with which the former is more or less ornamented, and it has rather a deeper suture.

2. — *undatum*, *auct.* (*Ency. Méthod.* t. 399. f. 1. *Buc. tenerum* (var. β .), *Min. Con.* t. 486).

Gedgrave. | Butley. | | Britain.

Buc. tenerum, var. γ . *elongatum*.

Ramsholt. | |

Sect. α . dextral.

1. *Terebra canalis*, n. s.

Gedgrave. | |

A few specimens in bad condition.

Sect. β . sinistral.

2. — *heterostropha*, n. s.

Gedgrave. | Sutton. |

1. *Murex*? *alveolatus*, *Sow.* (var. α . *Min. Con.* t. 411. f. 2).

| WaltonNaze. |

Var. β . *abbreviata*, *mihi* (*Purpura tetragona*, *Sow. Min. Con.* t. 414. f. 1).

| Sutton. |

Var. γ . *obsoleta*, *mihi*.

| Sutton. |

2. — *tortuosus*, *Sow.* (*Min. Con.* t. 434).

Sutton. | Sutton. |

3. — *erinaceus*, *Mont.* (*Test. Brit.* p. 259. *Don. Brit. Shells*, 1. t. 35).

| | Near Norwich. | Britain.

1. *Fusus antiquus* (*Tritonium antiquum*, *Müller, Zool. Dan. Prod.* no. 2939. *Murex striatus*, *Min. Con.* t. 119. *Murex striatus* var. *carinatus*, *id.* t. 22. *Murex contrarius*, *id.* t. 23. *Murex despectus*, *Mont. Test. Brit.* p. 256).

| Sutton. | Bramerton. | Britain.

A reversed specimen of the recent species in the possession of Mr. Bunbury corresponds in every respect with some of my specimens from the crag.

Cor. Crag. *Red Crag.* *Mam. Crag.* *Recent.*

2. *Fusus*? *elegans*, *Charlesworth (Mag. Nat. Hist. 1837, p. 218)*.
 The specimen figured at the above reference is the only one I have seen; it enriches the cabinet of Mr. Fitch, of Norwich, and was procured at Felixtow on the Suffolk coast. Mr. Charlesworth considers it to have been taken from the beach, and states that the finest specimens of *Voluta Lamberti* are thrown up by the sea at that spot.
3. — *angustus* (*Buc. angustus, List. An. Ang. 157. t. 3. f. 4. Murex corneus, Don. Brit. Shells, pl. 38. Fusus corneus, Sow. Min. Con. t. 35*).
 | Sutton. | | Britain.
4. — *altus*, n. s.
 | Butley. | |
- Not very unlike the preceding species, but differs in the shortness of its canal, in its more attenuated form and more mammillated apex.
5. — *scalariformis*, *Gould (Report, Inverteb. Massachusetts, p. 288. f. 203. Murex Peruvianus, Min. Con. t. 434. f. 1. Fusus lamellosus, Zool. of Beechey's Voy. pl. 36. f. 13)*.
 | Sutton. | | North Seas.
- Two varieties are found in the red crag.
6. — *costatus*, *Sow. (Min. Con. t. 34. and var. t. 39)*.
 | WaltonNaze. | |
7. — *echinatus*, *Sow. (Min. Con. t. 199)*.
 Sutton. | WaltonNaze. | |
- This much resembles *M. muricatus*, *Mont. Test. Brit. p. 262. t. 9. f. 2*, but differs in having its canal shorter and more open at the upper part, and less straight, more elevated spire, and striæ more distant.
8. — *alveolatus*, *Sow. (Min. Con. t. 525)*.
 | Sutton. | |
9. — *curvirostris*, n. s.
 Ramsholt. | Sutton. | |
10. — *intortus*? *Lamarck*.
 | Sutton. | |
- One imperfect specimen.
11. — *porrectus*? (*Murex porrectus, Brander, Foss. Hant. pl. 2. f. 36*).
 | Ramsholt. | |
- One specimen, much mutilated.
12. — ? *turriculus* (*Murex turriculus, Mont. Test. Brit. t. 9. f. 1. Murex angulatus, Don. Brit. Shells, t. 156. Pleurotoma clavula, Dujardin, Geol. Trans. of France, 1837, tom. ii. pt. 2. p. 291*).
 | Sutton. | Bramerton. | Britain.
- Two varieties from the red crag.
13. — *assimilis*, n. s.?
 | Sutton. | |
- Two imperfect specimens.
14. — *gracilior*, n. s.
 Sutton. | |
15. — ? *nebula* (*Murex nebula, Mont. Test. Brit. p. 267. t. 15. f. 6*).
 Sutton. | Sutton. | | Britain.

My specimens are larger than the generality of the recent British, and they are also less slender, but otherwise correspond.

	<i>Cor. Crag.</i>	<i>Red Crag.</i>	<i>Mam. Crag.</i>	<i>Recent.</i>
16. <i>Fusus paululus</i> , n. s.	Sutton.	|	|	|
Axis one line. This much resembles a small shell figured and described as <i>Fusus nanus</i> by Lea, <i>Contribut. to Geol.</i> pl. 5. f. 155; but the crag shell is beautifully cancellated on the body whorl, which I do not see in the above figure, nor is there any mention made of such ornament. I have only one specimen.				
17. —? <i>rufus</i> (<i>Murex rufus</i> , <i>Mont. Test. Brit.</i> p. 263).	|	|	Thorpe.	Britain.
1. <i>Pleurotoma</i> ? <i>variegatum</i> , <i>Phil. (Enum. Moll. Sic.</i> p. 197. t. 11. f. 14).	Sutton.	| . . . . .	| . . . . .	| Mediterranean.
2. —? <i>lineare</i> (<i>Murex linearis</i> , <i>Mont. Test. Brit.</i> p. 261. t. 9. f. 4. <i>Mangelia linearis</i> , <i>Leach MS.</i>).	Sutton.	| Sutton.	| . . . . .	| Britain.
3. —? <i>cancellatum</i> (<i>Fusus cancellatus</i> , <i>Min. Con.</i> t. 525).	Sutton.	| Sutton.	|	|
4. —? <i>mitrula</i> (<i>Buccinum mitrula</i> , <i>Min. Con.</i> t. 375).	Sutton.	| Sutton.	|	|
5. — <i>intorta</i> (<i>Murex intorta</i> , <i>Brocchi, Conch. Foss. Subapen.</i> t. 8. f. 17).	|	Butley.	|	|
6. — —?	Sutton.	| Sutton.	|	|
7. — —?	Sutton.	| Sutton.	|	|
8. — —?	|	Sutton.	|	|
9. — —?	|	Sutton.	|	|
The markings of these four species of true <i>Pleurotomæ</i> are so much obliterated as to render them unfit for comparison.				
10. — <i>tuberculosum</i> .	Sutton.	| Walton Naze.	|	|
11. — <i>porrectum</i> .	Sutton.	|	|	|
Identical with a Touraine shell in Mr. Lyell's collection.				
12. —? <i>scabriusculum</i> , n. s.	|	Sutton.	|	|
13. —? <i>pliciferum</i> , n. s.	Sutton.	|	|	|
14. —? —?	Sutton.	|	|	|

There are probably two or three more species from the coralline

crag of these canaliculated shells, but my specimens are very imperfect.

- | | Cor. Crag. | Red Crag. | Man. Crag. | Recent. |
|---|------------|-----------|------------|--------------|
| 1. <i>Rostellaria plurimacosta</i> , n. s. | | Sutton. | | |
| 1. <i>Aporrhais pespelicani</i> (<i>Aporrhais quadrifidus</i> , <i>Da Costa, Brit. Con.</i> p. 136. t. 7. f. 7. <i>Strombus pespelicani</i> , <i>Linn. Syst.</i> p. 1207. <i>Rostellaria pespelicani</i> , <i>Min. Con.</i> t. 558). | | Sutton. | ..... |  |
| 1. <i>Pyrula reticulata</i> ? <i>Lamarck (Hist. des An. sans Vertèb.</i> t. vii. p. 141. <i>Ency. Méth.</i> pl. 432. f. 2). | | Ramsholt. | ..... | East Indies. |

The exterior markings resemble those of the recent shell, but the upper part of the outer lip is more elevated. My fossil has lost a considerable portion of its canal, which makes it appear shorter, while the lines of growth indicate a length very nearly equal to that of the *reticulata*; it may possibly be a new species, but the condition of my single specimen is insufficient for such determination; as it is a rare shell, I have given a figure. Pl. V. f. 17.

- | | | | |
|---|---------|-----------|---------|
| 1. <i>Mitra plicifera</i> , n. s. | Sutton. | | |
| The mouths of all my specimens are broken. | | | |
| 1. <i>Voluta</i> ? <i>Lamberti</i> , <i>Sow. (Min. Con.</i> t. 129. <i>Mitra Lamberti</i> , <i>Flem. Brit. An.</i> p. 333). | | Ramsholt. | Sutton. |

The inhabitant of this shell, in all probability, differed from the true *Volutes*. It may constitute the type of a new genus; the want of an emarginated base will remove it from *Voluta*, and its mammillated apex from *Fasicolaria*.

Section *a.* with dorsal sulcus.

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|---|---------|-------------|--|
| 1. <i>Trivia avellana</i> (<i>Cypræa avellana</i> , <i>Min. Con.</i> t. 378. f. 3). | | Sutton. | |
| 2. — <i>testudinella</i> , n. s. | Sutton. | WaltonNaze. | |
| This is intermediate between <i>avellana</i> and <i>affinis</i> , and is exceedingly variable; specimens ranging in size from eleven-sixteenths of an inch (axis) to some scarcely one-fourth; ridges varying from as many as forty upon the exterior to one that has only twenty-four. | | | |
| 3. — <i>affinis</i> ? | Sutton. | Sutton. | |

Only three specimens, and those appear like monstrosities, probably varieties of the preceding.

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|--|--|---------|----------|
| 4. — <i>Angliæ</i> , n. s. | | Sutton. | |
| Section <i>β.</i> without dorsal sulcus. | | | |
| 5. — <i>Europæa</i> , <i>Gray</i> (<i>Cypræa pediculus</i> , <i>Mont. Test. Brit.</i> p. 200, and <i>Sup.</i> p. 88). | | Sutton. | Sutton. |
|  |  | ..... | Britain. |

This also varies considerably in size, from eleven-sixteenths to less than one-fourth of an inch.

- | | Cor. Crag. | Red Crag. | Mam. Crag. | Recent. |
|--|------------|-----------|------------|--------------|
| 6. <i>Trivium retusa</i> (<i>Cypræa retusa</i> , <i>Min. Con.</i> t. 378. f. 2). | Sutton. | \| Sutton. | \| | \| |
| 7. — <i>globulosa</i> , n. s. | \| | Sutton. | \| | \| |
| 1. <i>Erato lævis</i> , Gray (<i>Erato cypræola</i> , <i>Risso, Hist. Nat. des prin. prod. de l'Eur.</i> vol. iv. p. 240. pl. 7. f. 85. <i>Marginella voluta</i> , <i>Flem. Brit. An.</i> p. 335. <i>Cypræa voluta</i> , <i>Mont. Test. Brit.</i> t. 6. f. 7. <i>Voluta lævis</i> , <i>Don. Brit. Shells</i> , t. 145). | | | | |
| 2. — <i>Maugeriæ</i> , Gray (<i>Sow. Conch. Illust.</i> f. 47). | Sutton. | \| Sutton. | \| . . . . . | \| West Indies. |
- The West Indian specimens are generally a little smaller and rather more delicately formed than the crag shell.
1. *Ovulum Leathesii*, Sow. (*Min. Con.* t. 478. *Calpurna Leathesii*, *Flem. Brit. An.* p. 331).
- | | | | |
|---------|--------------|--|--|
| Sutton. | \| Walton Naze. | \| | \| |
|---------|--------------|--|--|

Corrigenda.

- Vol. vi. page 245. Note § refers to *Cultellus*, and not to *Solen siliqua*.
 Do. do. *Sphenia cylindrica* is the young of *Panopæa*.
 Do. page 251. *Cardium nodulosum* is *Cardium nodosum*, Turton.
 Do. do. *Nucula tenera* is *Arca tenuis* of Mont.

LVII.—*Observations on the Structure of the Pollen Granule, considered principally with reference to its eligibility as a means of Classification.* By ARTHUR HILL HASSALL, Esq., M.R.C.S.L., Corresponding Member of the Natural History Society of Dublin.

[Continued from vol. viii. p. 108.]

[With 6 Plates.]

THE second portion of this communication comprises a particular description of the principal forms of pollen granules met with by the author during his investigations, together with the names of all the plants examined, arranged according to Lindley's 'Natural System,' which is followed in every particular, save that the order of arrangement is reversed, the lower tribes of Phanerogamic plants being first enumerated.

VASCULARES.

ENDOGENS OR MONOCOTYLEDONS.

GLUMOSÆ.

CYPERACEÆ.

CHAR.—Outline of pollen grain ovate-lanceolate; extine covering only a portion of the intine, being deficient on either side, and at the